Bridges

Bridge Alternatives

The Bruce Freeman Rail Trail project will involve the rehabilitation or reconstruction of three (3) bridges. This corridor holds many valuable historic resources including these bridges that were constructed in the 20th Century. The existing bridge structures will be retained to the greatest extent possible to memorialize these resources. Each of the bridges have been inspected and the results of the inspections have been documented in the appendix of this report. In an attempt to rehabilitate the structures to match the original period in which they were built using modern materials we are proposing rehabilitating each bridge to give the appearance of weathering steel stringers with precast concrete deck panels and a timber railing as follows.

The proposed design loads for primarily bicycles and pedestrians (live load of 85 lbs/sf) and/or for an occasional maintenance/emergency vehicle (a single truck H-10 positioned to produce the maximum load) whichever is greater as per the AASHTO *Guide Specifications for Design of Pedestrian Bridges.*

■

Bridge No. 13.86 over Nashoba Brook

The existing steel stringers will be retained, the granite block abutments will be repointed as needed, precast concrete deck panels will be installed with a timber railing.

■

Bridge No. 14.81 over Nashoba Brook

The existing steel stringers and concrete deck will be retained as well as the rail siding remaining on the bridge. A membrane will be applied to the deck as needed. A 14-foot wide paved trail section will be constructed along the west (left) side of the bridge and stone dust will be placed to the top of track rail within and around the existing rail switch along the right side of the bridge as a historic feature. An interpretive sign will be placed on the bridge to explain the significance of the track layout.

Bridge No. 13.86 over Assabet River

The existing granite block abutments will be repointed as needed. A stub abutment will be cast-in-place to set the bearings and new weathering steel stringers will be installed with precast concrete deck panels, a riding surface and timber railings.

This bridge type will have a similar visual appearance that reflects the appearance of the other rail bridges in the project corridor which were constructed in the early 20th century.

Powder Mill Road Culvert

The existing culvert under Powder Mill Road does not meet the horizontal and vertical clearances prescribed in the project design criteria. The structure with be replaced with a precast concrete structure with historically accurate architectural treatments. Precast concrete technology has been advanced such that this type of structure will minimize construction costs, construction duration and traffic detours while providing a structure that accommodates the necessary clearances and maintains the historical character of the corridor.

As per direction from the Advisory Committee, the 25% plans have been prepared to reconstruct the existing culvert. An accessible pedestrian ramp has been designed along the north side of Powder Mill Road to the west of the trail.

Drainage

Existing Conditions

The rail bed is constructed mostly on an embankment or fill section so that surface runoff drains from the rail bed down the embankment slopes. There are some cut or excavated sections north of Commonwealth Avenue, just south of the Old Marlboro Road crossing, south of the Williams Road crossing and at the Powder Mill Road underpass. In the cut sections, runoff is collected in drainage ditches running parallel to the rail bed and conveyed to a natural outlet at a fill section. North of Williams Road in Jenny Dugan Swamp there is a 24-inch RCP culvert and a 3-foot x 5-foot stone box culvert that conveys watercourses under the rail bed embankment.

Field reviews of the culverts show no signs of overtopping or scour. Field walks along the rail bed corridor revealed no major erosion of the Railroad embankment section. There is some minor erosion of the existing rail bed ditch just north of the Powder Mill Road underpass and some minor loss of the embankment near the Sudbury line. The bottom of the slope at shoreline of White Pond shows evidence of erosion but appears related to activity on the Pond rather than runoff draining down the Railroad embankment slope.

The rail bed ditches are somewhat clogged with leaves and forest litter but the ditches appear to still drainage the rail bed effectively. There is some dumping of residential yard waste (grass clippings, leaves, dead ornamental shrubs) in the rail bed just south of Old Marlboro Road.

Summary of Proposed Improvements

Existing drainage patterns will be maintained. In fill sections, the trail typical section will be constructed on the existing grade of the Railroad embankment and cross-sloped to allow runoff to flow over the vegetated Railroad embankment side slopes. In cut sections, the ditches will be reshaped and graded to provide positive drainage of the trail and to avoid ponding of runoff that can cause frost damage to paved and unpaved surfaces. The existing culverts appear to have sufficient hydraulic capacity and do not require replacement.

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Environmental Issues

Environmental Resources

The Consultant was contracted by the Town of Concord to conduct an evaluation of natural resources within a 3.5-mile section of abandoned railroad right-of-way (the Project Area) associated with a proposed regional multi-use trail known as the Bruce Freeman Rail Trail. The evaluation included several tasks, including:

- A review of existing mapping, surveys, aerial photos, and other available sources of data;
- Field surveys for the evaluation of wildlife habitat within the project area;
- Delineation of state and federally-regulated wetland resources within the project area;
- Identification of significant plant communities (including exotic plant infestations); and
- An assessment of rare species habitat potential within the project area.

The purpose of the evaluation was to identify sensitive resources that could be affected by the construction and/or operational use of a shared-use trail.

Details of the environmental assessments completed for this project are included in the Appendix to this report and summarized in the following pages.

An Abbreviated Notice of Resource Area Delineation (ANRAD) has been prepared and submitted to the Concord Natural Resource Commission (NRC) and has been the subject of several public hearings. As of January 31, 2008, the Consultant is coordinating with the NRC for minor revisions of a portion of the regulated resource area boundaries. Pending the issue of an Order of Resource Area Delineation by the NRC, the boundaries on the 25% plans may be modified slightly. We do not anticipate that these boundary revisions will result in significant changes to the 25% design.

Contaminated Soil

Historic use of rail beds involved the use of oil and coal to power the trains and the use of herbicides to manage vegetation. The potential exists that soils in the proximity of the rail lines could be contaminated by oil or hazardous materials posing liability concerns for the Town.

The previous Feasibility Study included a review of various databases which did not indicate any overt sources of contamination within the limits of the rail bed. The study did note some concern regarding possible contamination related to the MCI Concord site. Town officials have met with MCI Concord staff and received comments regarding the trail design. It is recommended that further coordination of the 25% design with the MCI Concord staff be undertaken to finalize the trail alignment and location adjacent to the MCI facility. Pending that coordination, a detailed site assessment including a soil sampling program may be warranted.

For the remainder of the project corridor, the trail is designed to minimize disturbance of existing soil in accordance with the MA DEP *Best Management Practices for Controlling Exposure to Soil during the Development of Rail Trails*. The proposed trail surface and shoulders are set above grade to minimize soil excavation. The trail surface base and surface course will generally be constructed over the former track centerline effectively capping the area directly beneath the railroad ties and rails. Soils that are excavated can be spread over the shoulder area and covered with soil and landscape.

Specifications detailing the process soil monitoring, handling and disposal and disposal of wood railroad ties as solid waste are standard MassHighway construction items. These specifications have been used to effectively and cost-efficiently address this issue on rail trail construction contracts throughout the state.

Massachusetts Environmental Policy Act

The Massachusetts Environmental Policy Act (MEPA) has been reviewed for thresholds pertaining to land, rare species, wetlands, waterways, and tidelands, transportation, and historical and archaeological resources. A complete list of ENF and Mandatory EIR thresholds are contained in the Appendix – Environmental Evaluation.

In March of 2007, the Executive Office of Environmental Affairs issued an Advisory Opinion pertaining to MEPA filing requirements for the BFRT. This opinion found: *"the Bruce Freeman Rail trail is not a common plan or undertaking requirements the submission of a single environmental review document under MEPA. However, in order to ensure due compliance with MEPA, I will require each municipality to submit an Environmental Notification Form (ENF) for its own portion of the rail trail, provided that it*

would exceed MEPA review thresholds. Each ENF should include an analysis of alternatives, including alternative alignments, and should present a project with logical endpoints, such as a road or public park, rather than municipal boundaries, in order to preserve the ability of adjacent municipalities to explore alternative alignments that avoid or minimize environmental impacts."

Therefore, at a minimum, the Concord portion of the BFRT will require the filing of an ENF under MEPA.

Cultural Resources

The PAL, Inc conducted a Cultural Resources Survey focused on the remnants of the Railroad infrastructure along the project corridor. The complete PAL Report can be found in the Appendix to this report.

PAL staff found that the corridor retains a moderate to high degree of integrity and is interpretable as a linear railroad landscape. In addition, PAL identified 48 railroad-related buildings, structures and landscape features along the project corridor. These include the very visible features such as the existing bridges, the West Concord Station building, and the still-operable switches north of the station at the Nashoba Brook bridge. Also, less visible features were found throughout the corridor including whistle posts, flanger signs, mile markers, a semaphore, and electrical boxes for relays and switches. The location of these features and a legend are noted on the 25% plans and in PAL's report.

PAL's recommendations for retention and interpretation of the railroad features have been included in the 25% design to the extent possible. Of note is the interpretative opportunity provided by the switch at West Concord Station. A possible interpretive design could retain the switch rails, ties and switch mechanisms. Stone dust material could be placed between the ties and rails up to the top of rail, thus leaving the outline of the switch visible. An interpretive sign describing the former station and rail yard layout could be placed accordingly. It is also our understanding that the Concord Historical Commission is undertaking a restoration of the West Concord Station building.

It is recommended that PAL's report be reviewed with the goal of developing a corridor railroad interpretive program in coordination with the Concord Historical Commission and their station restoration project as part of the final design. Numerous other rail trails including the Assabet River Rail Trail have developed walking tours of the corridor with railroad features highlighted.

Summary and Recommendations

The evaluation included several tasks to identify sensitive natural resources within the project area that could be affected by the construction and/or operational use of a shared-use trail. Though a variety of environmental resource areas are found along the ROW, none appear to be of particular constraint to the development of the trail. The wildlife habitat review indicates that the wetland resource areas vary in habitat value but also concluded that no high value habitat features would be directly impacted by the construction of a the trail. Additionally, no evidence of species that would be especially sensitive to the trail were identified through the survey. The 25% trail design has incorporated the constraints identified herein. Recommendations for further study should be incorporated into the future 75% design plans.

Recommendations for design considerations or further study include the following:

- Consideration should be given to enhanced erosion control measures and treatment of existing erosion issues proximal to White Pond.
- Timing of construction activities should consider proximity to vernal pools and avoid critical migratory periods.
- Final design plans may warrant inclusion of monitoring and potential treatment of invasive plant infestations to prevent the further spread of such species along the ROW.
- The final landscape design should exclusively use native species to counteract presence of exotic invasive species.
- Continued coordination with NHESP by the Concord Natural Resources Commission should occur to coordinate the need for further studies and/or MESA permitting pertaining to rare species within the project corridor.

Construction Phasing

Construction Cost

The preliminary construction cost for the Concord portion of the Bruce Freeman Rail Trail from Commonwealth Ave to the Sudbury Town Line **is estimated to be $ 6,498,677.25** This cost estimate includes all work (clearing, grading, pavement structure, railings, bridges, walls, landscape, signs and pavement markings) associated with the complete construction of the rail trail as shown on the 25% design plans. This cost also includes the construction of a new bridge over the Assabet River and rehabilitation of one of the two existing bridges over Nashoba Brook. All bridges have been designed to accommodate a single emergency/maintenance vehicle loading. The cost does not include the removal, containment or disposal of lead paint from the bridges. This project assumes that the existing tunnel under Powder Mill Road will be replaced, as directed by the Town, and a pedestrian access ramp will be constructed to provide pedestrian access from Powder Mill Road to the trail north of Powder Mill Road. The cost does not include the removal, containment or disposal of lead paint from the bridges.

A 30% contingency has been incorporated into the cost to account for details that have yet to be designed.

Construction Phasing

Ultimately, the Bruce Freeman Rail Trail in Concord will be part of a 25-mile trail corridor that will extend from Lowell to Framingham. The rail trail is being designed in segments by individual communities and constructed in segments by the communities and the Massachusetts Highway Department. The Lowell portion of the project is under construction. The Town of Acton and the Town of Sudbury are in the early stages of design. MassHighway is proceeding with the design for the reconstruction of the Route 2 Rotary. It is unlikely that all of these projects will proceed on the same schedule; therefore it is necessary to phase the construction of the Concord portion of the BFRT to provide logical interim trail termini. As per direction for the Town, the 25% plans have been phased as follows:

Phase 1 from the Sudbury Town line to the south side of Powder Mill Road

Phase 2 from the north side of Powder Mill Road to the new parking lot at Commonwealth Avenue
Phase 3 from Commonwealth Ave to Route 2.

It is understood that the third phase of the project will be included in the Route 2 Rotary project The Town wishes to move ahead with the design of Phase 1, and 2 as part of the base project.

A hammerhead turn around will be provided at both ends of the trail to provide adequate room for emergency vehicles access. A temporary turnaround has been designed north of Powder Mill Road for the phase 2 portion of the project.

As noted in this report, the construction activities should be designed to avoid impacts to the surrounding environment, taking notice of vegetation and tree canopy to remain, as well as to wildlife.

Maintenance and Operations

Maintenance

As a public way, it is the responsibility of the Town of Concord to maintain the rail trails, as it would any other public way. Identification of maintenance needs and implementing good maintenance practices are key elements in providing safe facilities for bicyclists and pedestrians. Basic maintenance activities include keeping the trails surface free of debris, identifying and correcting surface hazards, keeping signs and pavement markings in good condition and cutting back encroaching vegetation to maintain adequate sight distances on the trail and at road crossings. Having a written operations and maintenance plan and an emergency response plan will also enable town officials to determine manpower and budgets needed to implement these plans.

For the Concord section of the BFRT, The Consultant met with the Town Engineer, Department of Public Works and the Concord Police and Fire Departments to review the project design, access, maintenance, enforcement and emergency response issues. Their recommendations as coordinated with other Town officials were incorporated into the project design.

The Maintenance and Operations section in the Appendix provides guidance to the Town of Concord on the general maintenance requirements for these types of initiatives. It includes a copy of Chapter 22 from the publication FHWA BIKESAFE: Bicycle Countermeasure Selection System regarding maintenance of bicycle facilities. Also included are copies of Resources for Trail Managers and checklists for maintenance tasks and budgets from the Rails to Trails Conservancy report Rail-Trail Maintenance and Operation.

It is recommended that the Town officials review these materials and finalize formal written operation and maintenance plans and emergency response plan for the trail.

Operations

The Town's vision of the Concord Section of the BFRT is as a non-motorized shared-use facility for use by bicyclists and pedestrians. The design complies with accepted industry standards and criteria for a bicycles and pedestrians and encourages users

to comply with uniform traffic operations and laws. Thus the signs, pavement markings and other amenities are designed to convey that message through the use of common standards of color, shape and graphics as used on typical roadway signs without "oversigning" the natural landscape.

It is recommended that trail use rules be posted at trail access points, as appropriate.

It is recommended that the Town review their existing by-laws as they relate to rail trails and shared-use facilities to verify if changes or additions are needed. The Maintenance and Operations section of the Appendix contains a copy of by-laws adapted by the town of Milford, MA for regulating use on the their section of the Upper Charles River Trail.